REMARKS

Reexamination and reconsideration of the claims 1-12 are respectfully requested. Applicants appreciate and acknowledge the Examiner's consideration of all the references on the IDS.

Claims 1-3, 7-8, and 12 were rejected under 35 U.S.C. sec. 102(b) applying GB 2,227,572 (the '572 patent). For a patent to be applicable under sec. 102(b), the patent must, *inter alia*, disclose each and every feature of the claimed invention.

It is respectfully submitted that the Office Action misinterpreted the '572 patent because it does not teach, disclose, or otherwise suggest each and every feature of independent claims 1 or 7. Specifically, the '572 patent is directed to a loose tube construction where the tube is filled with a filling material. See p. 2 of the '572 patent. Specifically, the first paragraph of p. 2 of the '572 patent states:

> According to one aspect of the present invention there is provided a method of manufacturing an optical fibre package including the steps of providing a loose tube construction by disposing one or more optical fibers within a tube, filling the tube with a filling material, the filling material or tube being such that the application of radiation to the filling material in the tube either intermittently or continuously along the length of the tube results in blocking of the tube at intervals along its length, and applying said radiation.

Simply stated, the '572 patent discloses that the method of manufacturing the loose tube construction places one or more optical fibers within a tube and fills the tube with a filling material. Moreover, the '572 patent expressly states that the invention uses a conventional loose tube manufacturing line. See p. 4, third paragraph of the '572 patent.

The '572 patent does not disclose applying a filling compound intermittently to the at least one optical waveguide in a liquid state, feeding the at least one optical waveguide into

an extruder to form a slot element around the optical waveguide, wherein the filling element expands with the slot element, thereby forming a plurality of dry, compressible elements that are disposed about the at least one optical waveguide.

The Office Action states that the '572 patent discloses a process for manufacture of an optical transmission element comprising the steps of: "applying a filling compound intermittently to the at least one optical waveguide (page 4, third paragraph), wherein the filling compound is applied in a liquid state (page 3, fourth line after the Figure summary); feeding the at least one optical waveguide into an extruder to form a slot element around the at least one optical waveguide (Rowland [the '572 patent] refers to the well-known term in the art "loose tube manufacturing line" page 3); wherein the filling compound expands within the slot element (Rowland refers to this reactive state as 'a viscous filling material which is cross-linkable by exposure to electromagnetic radiation' the term cross-link is understood in the art that a resin reacting to the curing radiation and resulting in the transformation from a viscous material into a foam material see page 2), thereby forming a plurality of dry, compressible elements that are disposed about the at least one optical waveguide." <u>See</u> pp.2-3 of the Office Action dated February 28, 2006. This is an incorrect interpretation of the '572 patent.

First, the Office Action misinterpreted the term cross-linking. Cross-linking does not mean a resin reacting to the curing radiation and resulting in the transformation from a viscous material into a foam material as stated in the Office Action. Moreover, there is no support whatsoever for this asserted construction.

Instead, the skilled artisan would have understood that cross-linking is the mechanism for creating a three-dimensional network in a radiation curable material (i.e., the mechanism for

changing the liquid material into a more solid material). Additionally, a web page is attached hereto entitled "Crosslinking mechanism" which briefly explains crosslinking. The '572 patent states the following with respect to cross-linking on p. 2:

> According to another aspect of the present invention there is provided a method of manufacturing an optical fibre package including the steps of providing a loose tube construction by disposing one or more optical fibers within a tube, filling the tube with a viscous filling material which is cross-linkable by exposure to electromagnetic radiation, the tube being of a material which is transparent to said electromagnetic radiation, and exposing said filling material to said electromagnetic radiation at least at intervals along the length of the tube whereby to cross-link the filling material and achieve blocking of the tube thereat.

Thus, the skilled artisan would have understood that crosslinking merely refers to altering the material structure to form a three-dimensional structure, thereby forming a more solid material. Consequently, the filling material does not expand within the tube thereby forming dry compressible elements, but instead forms a three-dimensional network. For at least this reason, the withdrawal of the sec. 102(b) rejection of claims 1-3, 7-8, and 10 is warranted and respectfully requested.

Claims 4 and 5 were rejected under 35 U.S.C. sec. 103(a) applying the '572 patent in view of U.S. Pat. No. 5,007,703 (the '703 patent). To be applicable under sec. 103(a), the combination of teachings must, *inter alia*, expressly or inherently, teach, disclose, or otherwise suggest each and every feature of the claimed invention. Additionally, motivation and suggestion to combine the patents must be present.

It is respectfully submitted that the Office Action misinterpreted the '703 patent. The Office Action states the following with respect to the '703 patent at page 4:

> Hale [the '703 patent] discloses in Fig. 2 the

> manufacturing process of wherein the filling compound is mixed and injected (16) into the slot element provided by drum (10) and the die (17) closes the slot element. The filling compound expands before reaching the drum (19). Since litter [little] information is disclosed regarding the specific extruder that applicant uses, the examiner considers the exit of the extruder is leftward from the arrow labeled '12'. Thus reading on the limitation of claim 4.

First, the manufacturing method of the '703 patent does not teach an extruder. Instead, the '703 patent is directed a submarine cable that requires a closing die 17 for shaping the metal C-section. See the Abstract and Fig. 2 of the '703 patent. More specifically, the C-section material is copper, but may be another metal such as aluminum or an alloy. See Col. 3, ll. 16-20 of the '703 patent. The skilled artisan would have understood that manufacturing the submarine cable requires using a metal shell to withstand the undersea environment. Thus, a closing die 17 is required for shaping the metallic c-section.

Second, neither reference of the purported modification teaches, discloses, or otherwise suggests that the filling compound expands within the slot element, thereby forming a plurality of dry, compressible elements that are disposed about the at least one optical waveguide.

Instead, the '703 patent teaches a two-part polyurethane filling material that is cured into a resilient solid. Specifically, the '703 patent states the following at Col. 3, ll. 20-48:

> The process of the present invention is a one-shot process which basically comprises insertion of fibres and liquid filling material directly into a C-section, closing C-section and changing (curing) the filling material to a state in which it is a resilient solid. The result is a submarine cable core package which is shown in cross-section in Fig. 1 and comprises a plurality of primary coated fibers 1 which are held in predetermined position relative to one another by cured filling material 2 that was inserted into a C-section in a liquid state together with the fibres 1, the C-

section having been closed subsequently to provide a pressure tube 3. Since the curing process takes place within a closed metallic C-section, a number of cross-linking mechanisms are ruled out, particularly the use of ultra-violet or other types of irradiation. The reaction rate is required to be rapid since the fibres are required to remain in registered positions and therefore cure must be complete before the package is wound onto a storage drum. The cure time thus should be of the order of a few seconds.

Rapid cure times are achievable with two-part systems which cure after mixing, even at room temperature, although heat may accelerate the process.

A presently preferred filling material comprises a two-part polyurethane whose parts are initially liquid but which when mixed react rapidly to produce a solid polymer, the reaction being exothermic. Such a filling material is referred to as a two-part exothermal curing polyurethane.

Thus, the filling material of the '703 patent is a two-part polyurethane that hardens (i.e., is cured) into a solid polymer in an exothermic reaction. In other words, the filling material of the '703 part is merely cured (hardens) after mixing the two-parts of the polyurethane which starts the reaction process. Moreover, the '703 patent states the following at Col. 4, ll. 47-50:

The fibres are fed into the C-section and prior to the C-section being closed the mixed filling material is inserted into the C-section at a sufficient flow rate to ensure adequate fill.

For at least the reasons stated, the purported modification failed to make a *prima facie* case with respect to claims 4 and 5. For at least the reasons stated, the withdrawal of the sec. 103(a) rejection of claims 4 and 5 is warranted and respectfully requested.

Claim 11 was rejected under 35 U.S.C. sec. 103(a) applying the '572 patent in view of U.S. Pat. No. 6,658,184 (the '184 patent). For the reasons stated above with respect to the '572

patent, a *prima facie* case of obviousness with respect to dependent claim 11 is lacking. Thus, the withdrawal of the sec. 103(a) rejection of claim 11 is warranted and respectfully requested.

No fees are believed due in connection with this Reply. If any fees are due in connection with this Reply, please charge any fees, or credit any overpayment, to Deposit Account Number 19-2167.

Allowance of all pending claims is believed to be warranted and is respectfully requested.

The Examiner is welcomed to telephone the undersigned to discuss the merits of this patent application.

Respectfully submitted,

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Radiation curing Center

Crosslinking Mechanism

What is Radiation Curing?
Why use Radiation Curing?
Crosslinking Mechanism
UV Cure
EB Cure
Raw Materials
Market / Application
What Equipment?
UV Powder

Radiation is used to crosslink (Figure 1) or cure unsaturated organic resins into durable coatings having excellent physical properties with high chemical and temperature resistance. **Radiation curing technology involves at least four considerations:**

- type of radiation source,
- organic polymer to be irradiated,
- mechanisms of physical and chemical interaction,
- final properties associated with the cured product.

Radiation curing coatings react through unsaturated sites on oligomers and monomers. These active sites (double bonds) are capable of reacting to form larger and crosslinked polymers. Then, three dimensional network structures are obtained.

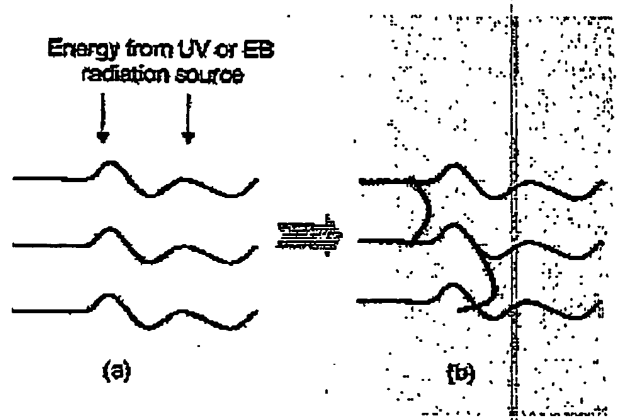

Figure 1: Interaction of UV or EB radiation with a linear polymer (a) to develop a crosslinked network structure (b).

When the UV or EB radiation dose increases, the molecular weight increases as well, resulting for the coating properties in:

- a decrease of tack,
- an increase in cohesive strength,
- an increase in temperature and chemical resistance.

The exact curing window for a product must be determined for every formulation and for each thickness. For many radiation curing coatings, the processing window is narrow, making it easy to under-cure or over-cure the coating.

The main sources of energy for curing coatings by radiation are electron beam (EB) and ultraviolet light (UV). Both provide instantaneous curing of coatings that polymerize from a liquid to a solid when irradiated.